ALUMINUM
Success Story

Onsite Process for Recovering Waste Aluminum

Efficient New Technology for Recovering Waste Aluminum in Wheel Manufacturing

Benefits

- Reduces the volume of waste by-product (dross) by 75%
- Results in energy savings due to melting waste chips only once instead of twice
- Reduces machining coolant requirements by 50% thus conserving the petroleum feedstock used to produce coolant
- Decreases airborne fumes, dust, and emissions due to the use of a premelt incinerator
- Decreases diesel fuel use because of reduced transportation of clips offsite for treatment

Applications

This process can be used for aluminum wheelmaking and other metal processing and fabricating operations.

Project Partners

- NICE³ Program
  Washington, DC
- AAP St. Marys
  St. Marys, OH
- Ohio Department of Development
  Columbus, OH

In 1993 AAP St. Marys modified its handling of waste aluminum by developing an onsite process for recycling the aluminum chips used in manufacturing automobile wheels. Compared with the offsite process the company formerly used, AAP St. Marys has increased its yield of usable aluminum by 6.5%, reduced its waste by-product volume by 75%, and reduced machining coolant requirements by 50%. This process can also be applied to other metal processing and fabricating operations that produce waste metal chips.

Aluminum automobile wheels are produced as rough castings that are subsequently cut and ground to the desired shape and finish. In that process, about 30% of the aluminum content is machined away as chips. When the aluminum chips were shipped offsite, they were melted into aluminum ingots, which were then shipped back to AAP St. Marys for reuse. Recycling the aluminum chips onsite rather than offsite saves energy, improves the productivity of chip recycling, eliminates the transportation costs for the chips, and reduces airborne pollutants and other manufacturing wastes.

The modified process, which AAP St. Marys developed with grant funds from the U.S. Department of Energy's NICE³ (National Industrial Competitiveness through Energy, Environment, and Economics) Program, involves an efficient technology that melts the waste chips and increases the yield of reusable

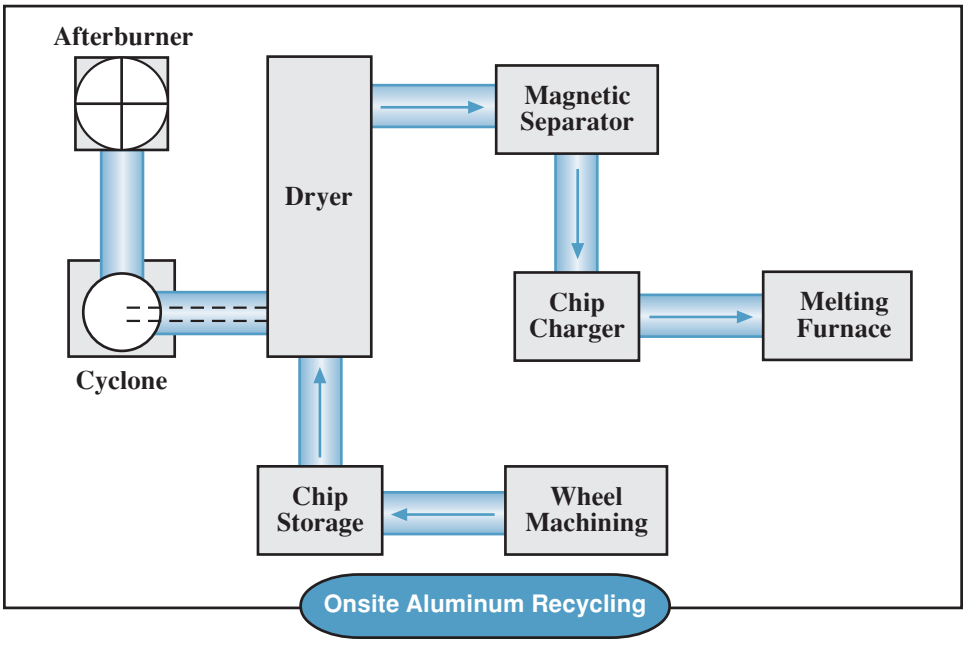
The as-cast wheel *(left)*, the finished wheel *(right)*, and the pile of aluminum chips resulting from finishing one wheel *(middle)*. AAP St. Marys finishes approximately 100,000 wheels per month.

aluminum. "The NICE^3 grant application process was a very useful tool for defining the tangible energy and waste reduction goals for the project," said Dan Hosek, Manager of Associate and Community Relations at AAP St. Marys.

Additional modifications to the melter have provided AAP St. Marys with further benefits. By adding an after-burner on the melting furnace, the company reduced airborne fumes, dust, and emissions to negligible levels. Also, adding a rotary chip dryer removes oil and machining fluids before the chips are sent into the melting furnace so they can be recycled.

The onsite technology has provided AAP St. Marys with current annual energy savings of 0.02 trillion Btu and a cumulative energy savings of 0.10 trillion Btu through 2000. The company's annual emission rates have been reduced as follows:

- SO_2 – 11 tons
- NO_X – 4 tons
- CO_2 – 1408 tons
- Particulates – 3 tons.



Industry of the Future — Aluminum

Through OIT's Industries of the Future initiative, the Aluminum Association, Inc., on behalf of the aluminum industry, has partnered with the U.S. Department of Energy (DOE) to spur technological innovations that will reduce energy consumption, pollution, and production costs. In March 1996, the industry outlined its vision for maintaining and building its competitive position in the world market in the document, ***Aluminum Industry: Industry/Government Partnerships for the Future.***

OIT Aluminum Team Leader: Sara Dillich (202) 586-7925.

NICE^3 – National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to $525,000. Grants fund up to 50% of total project cost for up to 3 years.

For project information, contact:

Dan Hosek
AAP St. Marys
1100 McKinley Road
St. Marys, OH 45855
Phone: (419) 394-7840
Fax: (419) 394-4776

For more information about the NICE^3 Program, contact:

Lisa Barnett
Program Manager
NICE^3 Program
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585-0121
Phone: (202) 586-2212
Fax: (202) 586-7114
lisa.barnett@ee.doe.gov

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